



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/847,139	05/02/2001	Lidia Luminita Mangu	YOR920010337US1	6592

7590

11/17/2003

Ryan, Mason & Lewis, LLP  
Suite 205  
1300 Post Road  
Fairfield, CT 06430

EXAMINER

LAO, TIM P

ART UNIT

PAPER NUMBER

2655

DATE MAILED: 11/17/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/847,139

Applicant(s)

MANGU ET AL.

Examiner

Tim Lao

Art Unit

2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 10-11, 13, 15-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Mangu et al. [1], ("Automatic rule acquisition for spelling correction," ICML 1997).

Regarding claim 10, Mangu et al. [1] discloses:

A method for determining a plurality of corrective rules from a plurality of training confusion sets, the method comprising the steps of:

determining a plurality of allowable transformations on the training confusion sets (pg. 3, col. 1, 2<sup>nd</sup> ¶, part 2);

providing an objective function (pg. 3, col. 1, 2<sup>nd</sup> ¶, part 3); and

learning a plurality of corrective rules for the training confusion sets, the step of learning using the allowable transformations and objective function (pg. 3, col.1, 3<sup>rd</sup> ¶).

Regarding claim 11,

determining a real-time confusion set (fig.1, blk. "Training Set" and pg.3, col.2, 4<sup>th</sup> ¶, sect. 3.1);

applying at least one of the corrective rules to the real-time confusion set (fig.1, blk. "apply rule" and pg.4, col.1, 2<sup>nd</sup> ¶).

Regarding claim 13, the method of claim 10, wherein the step of learning further comprises the steps of:

extracting a plurality of features from each of the training confusion sets, each of the features mathematically describing a characteristic of an associated one of the confusion sets (fig. 1, blk. "Training Set" and "baseline prediction"). Features of the training sets (confusion sets) must be extracted in order for the baseline prediction model, which is based on a posterior probability model, to mathematically describe the characteristics of the confusion sets.

Regarding claim 15, instantiating a plurality of template rules ("template set", p.4, col. 1).

Regarding claim 16, the method of claim 15, further comprising the steps of:  
providing a baseline predictor (fig.1, blk. "baseline prediction");

selecting a training confusion set (fig.1, blk. "Training Set");

determining which of the template rules are applicable to the selected training confusion set, whereby each applicable rule is a candidate rule (fig.1, blk. "derive and score candidate rule");

determining values of the features in each of the at least one predetermined criteria, the values determined from the selected training confusion set (fig.1, blk. "derive and score candidate rule");

scoring each of the candidate rules by using the objective function; selecting a highest scoring candidate rule; applying the highest scoring candidate rule to the baseline predictor to create a modified consensus hypothesis (fig.1, blk. "derive and score candidate rule"); and

selecting the highest scoring candidate rule as a corrective rule (fig.1, blk. "select rule" and "Rules"). The candidate rule with the best score is selected in "select rule" as the corrective rule in "Rules".

Regarding claim 17, Mangu et al. [1] discloses:

A method comprising the step of providing a truth (fig.1, blk. "Truth"), the truth indicating a correct word for each of the training confusion sets, wherein the step of scoring comprises the steps of:

selecting a candidate rule; (fig.1, blk. "derive and score candidate rules")

for each of the training confusion sets, performing the following steps:  
determining if the selected candidate rule chooses or does not choose a correct word, as determined from the truth, from the candidate words in the corresponding one of the confusion sets (fig.1, blk. "derive and score candidate rules");

providing a value determined from a number of incorrect words selected subtracted by a number of correct words selected (pg.3, col.2, 2<sup>nd</sup> ¶). Throwing away rule on the list implies that the incorrect words on the list are being discarded.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mangu et al. [1] in view of Mangu et al. [2], ("Finding consensus in speech recognition: word error minimization and other applications of confusion networks," October, 2000) and Stolcke et al., ("Combining words and speech prosody for automatic topic segmentation," 1999).

Regarding claim 14, Mangu et al. [1] show the step of extracting features from the confusion sets but do not show the characteristics of the features.

Stolcke et al. teach that extracted features comprise:

word identity (pg.1, col.1, 4<sup>th</sup> ¶);

duration (pg.2, col.1, 4<sup>th</sup> ¶, part 1); and

temporal position (pg.2, col.1, 2<sup>nd</sup> ¶).

Mangu et al. [2] teach that extracted features comprise:

difference in posterior probability between candidates (pg.25, 3<sup>rd</sup> ¶); and  
the number of candidate words (pg. 25, 3<sup>rd</sup> ¶).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the characteristics of the extracted features as taught by Mangu et al. [2] and Stolcke et al. in the step of extracting features as shown by Mangu et al. [1] in order to provide a more useful way to process the confusion sets of input speeches because these characteristics of features are most informative in predicting word correctness ( Mangu et al. [2], pg.25, 3<sup>rd</sup> ¶).

3. Claims 1-3, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mangu et al. [1] in view of Nadas et al. (US Patent No. 5,263,117).

Regarding claims 1-3, and 5, Mangu [1] show:

A method for correcting errors for consensus decoding of speech, the method comprising the steps of:

creating a confusion set comprising a plurality of candidate words, each of said candidate words having an associated score (fig.1, blk "Training Set" and pg.3, col.2, 4<sup>th</sup> ¶, sect. 3.1);

applying a rule to the confusion set (fig.1, blk. "apply rule" and pg.4, col.1, 2<sup>nd</sup> ¶).

determining a plurality of allowable transformations on a plurality of training confusion sets (pg. 3, col. 1, 2<sup>nd</sup> ¶, part 2);

providing an objective function (pg. 3, col. 1, 2<sup>nd</sup> ¶, part 3); and

learning a plurality of corrective rules for the training confusion sets (pg. 3, col. 1, 3<sup>rd</sup> ¶).

Mangu et al. [1] do not show:

selecting a candidate word other than a candidate word having a highest associated score;

outputting the selected word.

However, Nadas et al. show that the word candidates with the first and second highest scores (probabilities) are selected and outputted (col.11, L.37-43).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the error correction method in Mangu et al. [1] to include the selecting and outputting of the word candidates other than the candidate word having the highest score as taught by Nadas et al. in order to perform the transformation-based learning iterations which is based on selecting a set of rules with different ranking scores and output the best scoring rule. The use of transformation-based learning minimize or reduce the word-error rate.

4. Claims 4, 6-7, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mangu et al. [1] in view of Nadas et al., and further in view of Mangu et al. [2] .

Regarding claims 4, 6-7, Mangu et al. [1] and Nadas et al. show:

applying rule to a confusion in the method of claim 1.

Mangu et al. [1] do not show:



applying the rule to the confusion set when a candidate word in the confusion set has a posterior probability that is not greater than a predetermined threshold;

selecting the candidate word having the posterior probability that is greater than a predetermined threshold when this candidate word has a posterior probability that is greater than a predetermined threshold.

the step of learning when to select a candidate other than a candidate having a highest associated score.

the associated score is a posterior probability.

However, Mangu et al. [2] show :

selecting a candidate word in the confusion set that has a posterior probability that is not greater than a predetermined threshold (Mangu et al. [2], pg. 13, 2<sup>nd</sup> ¶ begins with "Two parameters...."). A predetermined threshold could be  $10^{-3}$ .

selecting the candidate word having the posterior probability that is greater than a predetermined threshold when this candidate word has a posterior probability that is greater than a predetermined threshold (Mangu et al. [2], pg. 21). Selecting a word candidate in which the candidate has a high percentage (i.e. 90% or 97%) of being the correct word implies selecting a candidate word having a posterior probability greater than a predetermined threshold.

learning when to select a candidate other than a candidate having a highest associated score (Mangu et al. [2], pg. 21).

the associated score is a posterior probability (Mangu et al. [2], pg. 11, sect. 3.7 and pg.20, 3<sup>rd</sup> ¶). Ranking is met by scoring.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the error correction method as shown in Mangu et al. [1] and Nadas et al. to include selecting word candidates based on threshold of posterior probability as taught by Mangu et al. [2] in order to perform the transformation-based learning iterations which is based on selecting a set of rules with different ranking scores or probability and output the best scoring rule. The use of transformation-based learning minimize or reduces the word-error rate.

Regarding claim 12,

Mangu et al. [1] and Nadas et al. show:

determining a real-time confusion set (Mangu et al. [1], fig.1, blk. "Training Set" and pg.3, col.2, 4<sup>th</sup> ¶, sect. 3.1);

applying at least one of the corrective rules to the real-time confusion set (Mangu et al. [1], fig.1, blk. "apply rule" and pg.4, col.1, 2<sup>nd</sup> ¶).

Outputting the selected candidate word (Nadas et al., col.11, L.37-43).

Mangu et al. [1] and Nadas et al. do not show that determining and selecting word candidates and applying corrective rules based on a predetermined probability threshold. However, Mangu et al. [2] show:

determining and selecting word candidates having posterior probability greater than a predetermined threshold (Mangu et al. [2], p.21). Selecting a word candidate in which the candidate has a high percentage (i.e. 90% or 97%) of being the correct word

implies selecting a candidate word having a posterior probability greater than a predetermined threshold.

selecting a candidate word in the confusion set that has a posterior probability that is not greater than a predetermined threshold (Mangu et al. [2], pg. 13, 2<sup>nd</sup> ¶ begins with "Two parameters...."). A predetermined threshold could be  $10^{-3}$ .

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the error correction method as shown in Mangu et al. [1] and Nadas et al. to include selecting word candidates based on threshold of posterior probability as taught by Mangu et al. [2] in order to perform the transformation-based learning iterations which is based on selecting a set of rules with different ranking scores or probability and output the best scoring rule. The use of transformation-based learning minimize or reduces the word-error rate.

5. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mangu et al. [1] in view of Nadas et al., and further in view of Brill, ("Transformation-based error-driven learning and natural language processing: A case study in part of speech tagging," 1995).

Regarding claims 8-9, Mangu et al. [1] and Nadas et al. do not show that the method of claim 1 uses a decision-tree data classifier. However, Brill teaches the difference between the techniques of using a decision-tree data classifier and transformation-based learning (pg. 8-13). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the decision-tree data classifier as taught by Brill in the transformation-based learning as shown by

Art Unit: 2655

Mangu et al. [1] in order to provide the error correction method more flexibility by employing a different but similar learning method.

6. Claims 19, 21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mangu et al. [1] in view of Roth (US Patent No. 5,907,839).

Regarding claim 19, 21, and 23, Mangu et al. [1] discloses:

A method for determining a plurality of corrective rules from a plurality of training confusion sets, the method comprising the steps of:

determining a plurality of allowable transformations on the training confusion sets (pg. 3, col. 1, 2<sup>nd</sup> ¶, part 2);

providing an objective function (pg. 3, col. 1, 2<sup>nd</sup> ¶, part 3); and

learning a plurality of corrective rules for the training confusion sets, the step of learning using the allowable transformations and objective function (pg. 3, col.1, 3<sup>rd</sup> ¶).

Mangu et al. [1] do not disclose a system with a memory that stores computer-readable code and a processor that implement the computer-readable code.

However, Roth discloses a system (fig.1, 100) for performing spelling correction based on confusion set modeling (col.1, L.33-38) comprises:

a memory (fig.1, 29) that stores computer-readable code ("application programs", col.7, L.14-21); and

a processor (fig.1, 3) that implements (executes) the computer-readable code (col.6, L.58-60).

A computer system is an article of manufacture. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the computer system as taught by Roth to implement the error correction method as shown by Mangu et al. [1] in order to perform the error correction method more efficiently.

7. Claims 18, 20, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mangu et al. [1] in view of Nadas et al., and further in view of Roth.

Regarding claims 18, 20, and 22, Mangu et al. [1] show:

a method for correcting errors for consensus decoding of speech, the method comprising the steps of:

creating a confusion set comprising a plurality of candidate words, each of said candidate words having an associated score (fig.1, blk "Training Set" and pg.3, col.2, 4<sup>th</sup> ¶, sect. 3.1);

Nadas et al. show that the word candidates with the first and second highest scores (probabilities) are selected and outputted (col.11, L.37-43).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the error correction method in Mangu et al. [1] to include the selecting and outputting of the word candidates other than the candidate word having the highest score as taught by Nadas et al. in order to perform the transformation-based learning iterations which is based on selecting a set of rules with different ranking scores and output the best scoring rule. The use of transformation-based learning minimize or reduces the word-error rate.

Mangu et al. [1] and Nadas et al. do not disclose a system with a memory that stores computer-readable code and a processor that implement the computer-readable code.

However, Roth discloses a system (fig.1, 100) for performing spelling correction based on confusion set modeling (col.1, L.33-38) comprises:

a memory (fig.1, 29) that stores computer-readable code ("application programs", col.7, L.14-21); and

a processor (fig.1, 3) that implements (executes) the computer-readable code (col.6, L.58-60).

A computer system is an article of manufacture. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the error correction method as shown by Mangu et al. [1] and Nadas in the system as taught by Roth in order to perform the error correction method more efficiently.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

A). Mangu et al., "Finding consensus among words : latticed based word error minimization, " Proc. of EUROSPEECH'99.

B). Golding, Andrew R., "A Bayesian hybrid method for context-sensitive spelling

C). Golding, Andrew R. 08/1997 5,659,771

Art Unit: 2655

D). Golding, Andrew R.	09/1999	5,956,739
E). Meador, III et al.	06/1997	5,638,425
F). Nemoto, Kazuo	06/2003	US 6,584,180 B2

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tim Lao whose telephone number is 703-305-8955.

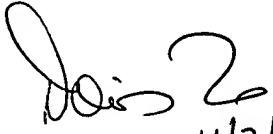
The examiner can normally be reached on M-F, 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached on 703-305-4827. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-9000.

Tim Lao  
Examiner  
Art Unit 2655

TL  
10/31/03

  
DORIS H. TO 11/3/03  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600